

Ministry of Education and Science of Ukraine
Sumy State University



JOURNAL OF ENGINEERING SCIENCES

Scientific Journal

Volume 7, Issue 1 (2020)

ISSN 2312-2498 (print)
ISSN 2414-9381 (online)

Founded in 2014

The “Journal of Engineering Sciences” is an open-access peer-reviewed scientific journal. It covers urgent issues of up-to-date high-tech production in the development of new engineering trends and future technologies. The general topics of the Journal include manufacturing, mechanical, and chemical engineering. The publication language is English. The editorial board is represented by scientists from different International research institutions that allows covering the Journal’s topics and evaluate all the submitted articles. The system of double-blinded review provides a high-quality presentation of articles. The editorial policy, including submission, review, acceptance, and publication of articles, are entirely transparent.

The Journal was founded in 2014. It is published by Sumy State University of Ministry of Education and Science of Ukraine with the support of the International Association for Technological Development and Innovations.

ISSN 2312-2498 (print)

ISSN 2414-9381 (online)

The Journal is intended for a wide range of researchers, practitioners, and others interested in Manufacturing, Mechanical, and Chemical Engineering. All the publications in the Journal are free of articles processing charges (APCs) and articles submission charges.

*Recommended for publication
by the Academic Council of Sumy State University,
(minutes No. 13 of June 26, 2020)*

The Journal is the scientific professional edition of Ukraine (Category “B”) in the field of Engineering Sciences ordered by the Ministry of Education and Science of Ukraine, November 7, 2018, [No. 1218](#).

Partners:

- Ministry of Education and Science of Ukraine: <https://mon.gov.ua>;
- International Association for Technological Development and Innovations: <http://iatdi.org>;
- Faculty of Mechanical Engineering of Poznan University of Technology: <https://www.put.poznan.pl/en/faculties/faculty-mechanical-engineering>;
- Faculty of Manufacturing Technologies with a seat in Presov of Technical University of Kosice: <http://www.fvt.tuke.sk>;
- Faculty of Mechanical Engineering of the University of West Bohemia: <http://www.fst.zcu.cz>.

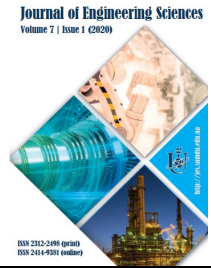
Editorial Board: 2, Rymkogo-Korsakova St., 40007 Sumy, Ukraine; Apt. LA 207

Contact Phone: +380-993-845-740

E-mail: jes@sumdu.edu.ua

Website: <http://jes.sumdu.edu.ua>

State registration certificate of the print mass-media No. 20499-10299 PR.



TOPICS

1. Manufacturing Engineering:

- Machines and Tools;
- Technical Regulations and Metrological Support;
- Materials Science.

2. Mechanical Engineering:

- Dynamics and Strength of Machines;
- Computational Mechanics.

3. Chemical Engineering:

- Processes in Machines and Devices;
- Energy Efficient Technologies;
- Environmental Protection.

STATISTICS

- **Publication frequency:** biannually (2 issues per year)
- **Papers per issue:** 20
- **Acceptance rate:** 26 %
- **Timeline:**
 - days from submission of the manuscript to first decision: 30
 - days from acceptance at the publisher to published online: 14
- **Editorial Board:**
 - members: 60
 - institutions: 41
 - countries: 24

EDITOR-IN-CHIEF

Dmytro KRYVORUCHKO, D.Sc., Professor, Sumy State University, Sumy, Ukraine

MANAGING EDITOR

Ivan PAVLENKO, Ph.D., Associate Professor, Sumy State University, Sumy, Ukraine

MANAGING CO-EDITORS

Manufacturing Engineering

Eddy BAJIC, Ph.D., Professor, University of Lorraine, Nancy, France

Jose MACHADO, Ph.D., Professor, University of Minho, Braga, Portugal

Mechanical Engineering

Jan PITEL, Ph.D., Professor, Technical University of Kosice, Presov, Slovakia

Thomas MATHIA, Ph.D., Professor, Ecole Centrale de Lyon, Lyon, France

Chemical Engineering

Mathieu GAUTIER, Ph.D., Associate Professor, University of Lyon, Lyon, France

Vsevolod SKLABINSKYI, D.Sc., Professor, Sumy State University, Sumy, Ukraine

INTERNATIONAL EDITORIAL BOARD

Praveen AGARWAL, Ph.D., Professor, Anand International College of Engineering, Jaipur, India

Peter ARRAS, D.Sc., Professor, KU Leuven, Leuven, Belgium

Volodymyr ATAMANYUK, D.Sc., Professor, Lviv Polytechnic National University, Lviv, Ukraine

Jean BOUYER, Ph.D., Associate Professor, University of Poitiers, Poitiers, France

Noel BRUNETIERE, Ph.D., Senior Researcher, University of Poitiers, Poitiers, France

Robert CEP, Ph.D., Professor, Technical University of Ostrava, Ostrava, Czech Republic

Olaf CISAK, Ph.D., Associate Professor, Poznan University of Technology, Poznan, Poland

Predrag DASIC, D.Sc., Professor, VTMS Trstenik, Trstenik, Serbia

Kostiantyn DYADYURA, D.Sc., Professor, Sumy State University, Sumy, Ukraine

Milan EDL, Ph.D., Associate Professor, University of West Bohemia, Pilsen, Czech Republic

Alex ENRICH-PRAST, Ph.D., Professor, Linkoping University, Linkoping, Sweden

Domenico GUIDA, Ph.D., Professor, University of Salerno, Salerno, Italy

Oleksandr GUSAK, Ph.D., Professor, Sumy State University, Sumy, Ukraine

Michal HATALA, Ph.D., Associate Professor, Technical University of Kosice, Presov, Slovakia

Koichi HASEGAWA, Ph.D., Associate Professor, Chubu University, Kasugai, Japan

Siamak HOSEINZADEH, Ph.D., Post Doc., University of Pretoria, Pretoria, South Africa

Vitalii IVANOV, D.Sc., Associate Professor, Sumy State University, Sumy, Ukraine

Yury IVANOV, Ph.D., Associate Professor, Chubu University, Kasugai, Japan

Fuat KARA, Ph.D., Assistant Professor, Duzce University, Istanbul, Turkey

Isak KARABEGOVIC, D.Sc., Professor, University of Bihac, Bihac, Bosnia and Herzegovina

Serhii KLIMENKO, D.Sc., Professor, Bakul Institute for Superhard Materials, National Academy of Sciences of Ukraine, Kyiv, Ukraine

Czeslaw KUNDERA, D.Sc., Professor, Kielce University of Technology, Kielce, Poland

Ivan KURIC, Ph.D., Professor, University of Zilina, Zilina, Slovakia

Milovan LAZAREVIC, Ph.D., Associate Professor, University of Novi Sad, Novi Sad, Serbia

Stanislaw LEGUTKO, D.Sc., Professor, Poznan University of Technology, Poznan, Poland

Oleksandr LIAPOSHCHENKO, D.Sc., Professor, Sumy State University, Sumy, Ukraine

Athanasios MAMALIS, D.Sc., Professor, Demokritos National Centre for Scientific Research, Athens, Greece
Arun MATHEW, Ph.D., Associate Professor, Vellore Institute of Technology, Vellore, India
Yurii MATSEVITYI, D.Sc., Professor, Podgorny Institute for Mechanical Engineering Problems, National Academy of Sciences of Ukraine, Kharkiv, Ukraine
Ronald MERISKY, Ph.D., Associate Professor, Widener University, Chester, USA
Arun NAGARAJAH, D.Sc., Professor, University of Duisburg-Essen, Duisburg, Germany
Eduard Laurentiu NITU, Ph.D., Professor, University of Pitesti, Pitesti, Romania
Dragan PERAKOVIC, Ph.D., Professor, University of Zagreb, Zagreb, Croatia
Alejandro PEREIRA, Ph.D., Professor, University of Vigo, Vigo, Spain
Yurii PETRAKOV, D.Sc., Professor, National Technical University of Ukraine “Kyiv Polytechnic Institute”, Kyiv, Ukraine
Roman PETRUS, D.Sc., Professor, Rzeszow University of Technology, Rzeszow, Poland
Leonid PLYATSUK, D.Sc., Professor, Sumy State University, Sumy, Ukraine
Frantisek POCHYLÝ, Ph.D., Professor, Brno University of Technology, Brno, Czech Republic
Erwin RAUCH, Ph.D., Assistant Professor, Free University of Bozen-Bolzano, Bolzano, Italy
Yimin RONG, D.Sc., Professor, South University of Science and Technology, Shenzhen, China
Vitalii SIMONOVSKIY, D.Sc., Professor, Sumy State University, Sumy, Ukraine
Michael STORCHAK, D.Sc., Professor, Institute for Machine Tools of Stuttgart University, Stuttgart, Germany
Fabio TEIXEIRA, D.Sc., Professor, Federal University of Rio Grande do Sul, Porto Alegre, Brazil
Justyna TROJANOWSKA, Ph.D., Assistant Professor, Poznan University of Technology, Poznan, Poland
Kaname TSUTSUMIUCHI, D.Sc., Professor, Chubu University, Kasugai, Japan
Raul TURMANIDZE, D.Sc., Professor, Georgian Technical University, Tbilisi, Georgia
Michal VARCHOLA, Ph.D., Professor, Slovak University of Technology in Bratislava, Bratislava, Slovakia
George-Christopher VOSNIAKOS, Ph.D., Professor, National Technical University of Athens, Athens, Greece
Jozef ZAJAC, D.Sc., Professor, Technical University of Kosice, Presov, Slovakia
Viliam ZALOGA, D.Sc., Professor, Sumy State University, Sumy, Ukraine
Lianyu ZHENG, Ph.D., Professor, Beihang University, Beijing, China

PUBLISHING MANAGER

Kristina BERLADIR, Ph.D., Senior Lecturer, Sumy State University, Sumy, Ukraine